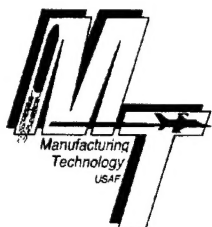


Summer 1996



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## The USAF Manufacturing Technology

# PROGRAM STATUS REPORT

Wright Laboratory / Manufacturing Technology Directorate / Wright-Patterson AFB, Ohio



The Wright Laboratory Manufacturing Technology Directorate (MT) is co-hosting the **1996 Roadmap Review** with the Materials Directorate July 16th - 18th, at the Dayton Convention Center. For more on this, see Page 3.

MT will also be involved in the **1996 Defense Manufacturing Conference**, taking place Dec. 2-5, in Miami. For details, see Page 2.

The Industrial Base Pilot Integrated Product Team held their second annual **Industry Days** event, March 19-20. The highlights of this event are on Pages 8 and 9.

Recent MT and defense initiatives are explained beginning on Page 2. Some environmental initiatives the directorate's engineers are involved with are detailed on Pages 4 and 5.

A program manager was honored by the Society of Women Engineers. See this story on Page 10.

McDonnell Douglas Aerospace bestowed their **Model of Excellence Award** to an Integrated Product Team with members from Wright Laboratory. For more on this, see Page 11.



# Affordable Multi-Missile Manufacturing to demonstrate advanced design

The Affordable Multi-Missile Manufacturing (AM<sup>3</sup>) program is a Defense Advanced Research Projects Agency (DARPA) Tri-Service program with the objective of demonstrating advanced missile design and manufacturing enterprise concepts and systems. Potentially, these concepts and systems can substantially reduce the cost of DoD's portfolio of tactical missiles and smart munitions, maintain product quality and performance, and allow rapid insertion of new technology.

MT personnel are working in conjunction with DARPA personnel, the Army ManTech orga-

nization in Huntsville, Ala., and the Naval Air Weapons Center at China Lake to manage four teams in pursuit of these goals. The four teams are led by:

- Texas Instruments/Hughes Missile Systems
- Loral, Vought, Northrop, and McDonnell

Douglas

- Lockheed Martin and Alliant
- Raytheon

The need for large quantities of missiles has decreased, resulting in a substantial increase in the unit cost of missiles, with the major cost driver being the overhead associated with excess capacity in this industrial sector. Under this initiative, the current paradigm of a production facility dedicated to one or two missiles will evolve to an integrated enterprise capable of producing a large family of missiles. Economies of scale are preserved by using the missile mix to compensate for the decline in individual missile quantities.

This concept requires an adaptability to change to new business practices, infrastructure investments and increasing manufacturing flexibility. Within this framework of multi-missile manufacturing, innovations and radical process re-engineering need to be implemented. The program challenges industry to demonstrate innovative concepts in the tactical missile sector to achieve cost and cycle time savings comparable to those that have been achieved by world class commercial manufacturers in other sectors.

The AM<sup>3</sup> program will define, validate, implement and demonstrate key changes to missile product architecture, and enterprise processes and systems, that significantly reduce missile costs. Product focus is on missile seekers and guidance and control sections which account for more than 60

## DMC '96 in Miami, December 2-5

The 1996 Defense Manufacturing Conference will be held Dec 2-5, in Miami Beach, at the Fountainbleau Hilton & Towers. The conference will be hosted by the tri-service Joint Directors of Laboratories, Manufacturing Technology Panel.

DMC '96 provides an opportunity to discuss current manufacturing issues with representatives from academia, industry and government agencies. More than 650 people attended last year's conference in Dallas, in which the Wright Laboratory Manufacturing Technology Directorate was a key participant.

For more information, or to register, contact the Universal Technology Corporation, (513) 426-2808, or FAX (513) 426-8755.

percent of missile unit production costs.

This program will be conducted in three phases:

Phase I, Concept Definition, will accomplish detailed functional design of multi-missile enterprises and associated systems; define cost reducing missile design concepts; detail analysis of the impact on cost of the targeted missile mix as defined by the contractor; identify technology gaps and enabling tools and technology; and detail a concept validation plan to be executed in Phase II. Key to this will be development of the cost analysis and the full benefits measurement process.

Phase II, Concept Validation, will assess and mitigate the risks of implementation and refine targeted demonstrations to prove the projected benefits of cost, cycle time, and quality are achievable. Validation of the proposed product design and enterprise concepts will include a combination of simulation and modeling, design and component-level manufacturing demonstrations, and qualification testing to assess the feasibility of innovative concepts. The impact of innovative technology and business practice concepts on the missile seeker application, as well as the commercial assembly industry sector, will also be assessed.

Phase III, Implementation and Demonstration,

will implement the key product design and manufacturing system, and the business practice concepts, across the target missile mix. Missile seeker demonstrations will convincingly prove the capability of implementing the validated design and enterprise concepts in actual multi-missile programs and of achieving the projected cost, cycle time, and quality goals. Corporate commitment to implementation of the product design and enterprise concepts will be shown via detailed corporate business plans and opportunities in dual-use commercial business markets.

For more  
information,  
circle  
Reader Response  
Number 1

*Project Engineer:*  
**Charles Wagner**  
WL/MTMM  
(513) 255-2461

*Contract Number:*  
**F33615-95-C-5546**

## Manufacturing Technology Directorate prepares for Roadmap Review

Industry, academia and government manufacturing leaders will gather at the Dayton Convention Center July 16-18, for the Wright Laboratory Materials Directorate and Manufacturing Technology (MT) Directorate Roadmap Review for 1996.

Dr. William C. Kessler, MT director, will host MT's portion of the event, July 18, which will give directorate engineers a public forum to discuss past program accomplishments, present planning activities, and future new starts.

The review will also allow officials to explain

how the directorate is meeting its mission to realize a responsible world-class manufacturing capability to affordably meet the needs of warfighters throughout the defense system. This overview will set the stage for the rest of the Roadmap sessions, which will provide a comprehensive examination of MT's programs.

For more information, or to register, contact the Universal Technology Corporation, (513) 426-2808, or FAX (513) 426-8755.

# Engineers strive to be environmentally conscious in electronic systems manufacturing

Manufacturing by-products of the electronics industry, and the disposition of electronic products, raise important technical and financial issues. There is a need to improve processes, materials and manufacturing equipment to prevent the production of hazardous waste material and its release into the environment. The ability to reuse and/or recycle the resulting products is also critical.

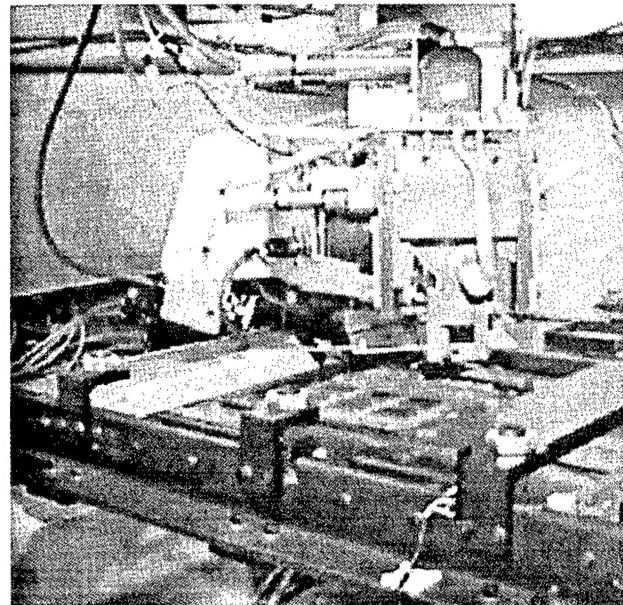
In light of this, engineers from the Manufacturing Technology Directorate (MT) are currently managing various contracts to make improvements needed to protect the environment.

The Environmentally Conscious Electronic Systems Manufacturing program takes a systems approach to considering these environmental demands from a total product life cycle perspective, to include design, production, use, and recycle or disposal. The Defense Advanced Research Projects Agency (DARPA) is currently funding nine projects through this initiative, and MT engineers are providing technical oversight. These projects are considering alternative processes designed to protect the environment.

One such project, under a contract with Dupont, is called "Permanent Dry Film Resist for Printed Wiring Board (PWB) Process Simplification." This effort will develop and demonstrate a permanent dry film resist in PWB manufacturing which will eliminate excess production steps, reduce waste generation by 30 percent, require no capital expenditures and reduce operating costs. Another project, being worked with PSI Technologies, is called "Zero Dump Electroplating Process Development." This will develop an electroplating system which will yield coating with precise property control without the need for additives in the plating bath, a major source of contamination. Another effort looking at additives is under con-

tract with Microelectronics and Computer Technology Corporation. "Revolutionary Environmental Manufacture of PWBs with Electroless Plating" will develop and demonstrate an additive approach, electroless copper plating, for fabrication of high performance PWBs. The core of this approach is a novel, solventless photo-dielectric dry film concept.

Reducing or eliminating free fluorols and hydrofluoric acid, currently used in the fabrication



of structures formed in silicon for electronics, is the goal of a contract being worked by Georgia Tech Research Institute. The "Alternatives to the Use of Fluoride and Hydrogen Fluoride in Electronics" effort will eliminate the use of free fluorides and polymer masks and produce higher quality, unique structures which offer enhanced performance at potentially lower cost, with the added bonus of environmental benefits.

MT personnel are working with Adherent

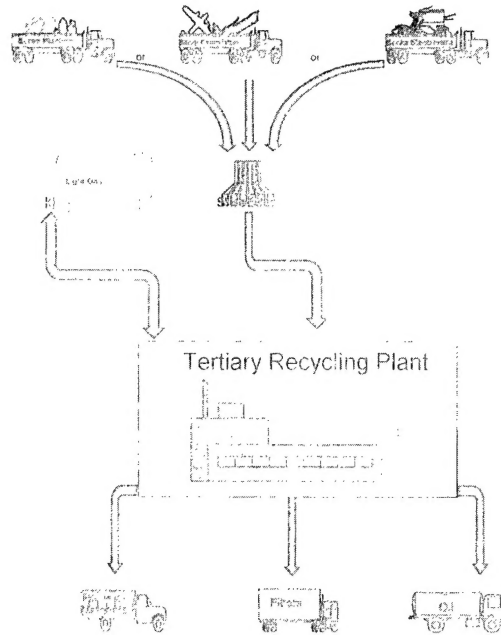
Technologies Inc., on a program called "Tertiary Recycling Process for Electronic Materials." This project is investigating the suitability of an economical chemical or fuel-producing process for recycling scrap electronics components. This process would convert polymers and composites into hydrocarbons which could then be used as chemicals, fuels or monomers, with the metals, glass, ceramics and fillers separated for reclamation.

In another effort, Jet Process Corp. will develop and industrialize its jet vapor deposition process to serve as a clean, dry, efficient, low-cost, additive metallization process for large scale use in manufacture of microelectronics packaging and interconnect products. "Jet Vapor Deposition: A New Environmentally Sound Manufacturing Process" addresses the compelling need for new environmentally benign metallizing processes to replace electroplating in electronics systems manufacturing.

Eliminating the use of liquid chemicals during the soldering process for components, printed wiring boards and electronic packages is the objective of an effort called, "Fluxless, No Clean, Solder Processing of Components, Printed Wiring Boards, and Packages." Specific processes to be addressed include the liquid flux material used to chemically dissolve metal oxide prior to solder flow cleaning. Under a contract with the Electronics Technology Division of MCNC Corp., the program will result in use of less materials that harm the environment, and will also reduce costs and require less energy.

"Green Card: A Biopolymer Based and Environmentally Safe Printed Wiring Board Technology" is a project designed to use biopolymers and non-toxic metals to reduce environmental concerns in fabrication, assembly, and disposal of PWBs. These materials will be used to develop a "Green Card," which is designed so it recycles easier, reduces dependence on oil-based resources, uses less

## Tertiary Recycling Process



energy to produce, and efficiently uses and reduces current waste streams. IBM Research Division is under contract to complete this project.

Developing an industry-driven roadmap to increase environmental compliance of the electronics manufacturing industrial base is the goal of an effort called, "Continuation of Electronics Industry Environmental Roadmap." MCC is under contract to lead a task force composed of industry, university, consortia and industry association team members toward the goal of coordinating, analyzing and disseminating an updated edition of the September 1994 roadmap. Sectors being addressed include: integrated circuits; printed wiring boards; packaging and assembly; displays; electronics disposition; business regulations and standards; and design for the environment.

For more  
information,  
circle  
Reader Response  
Number 2



# Military Products Using Best Practices enters second phase

ManTech and the C-17 System Program Office have announced the go-ahead for the second phase of the "Military Products Using Best Commercial/Military Practices" pilot program. This pilot program grew out of the joint Air Force and Industry Manufacturing 2005 Initiative. The objective of this two-phase, 48-month, \$40.7 million dollar effort is to define a new way of doing business between government and industry to achieve significant gains in affordability.

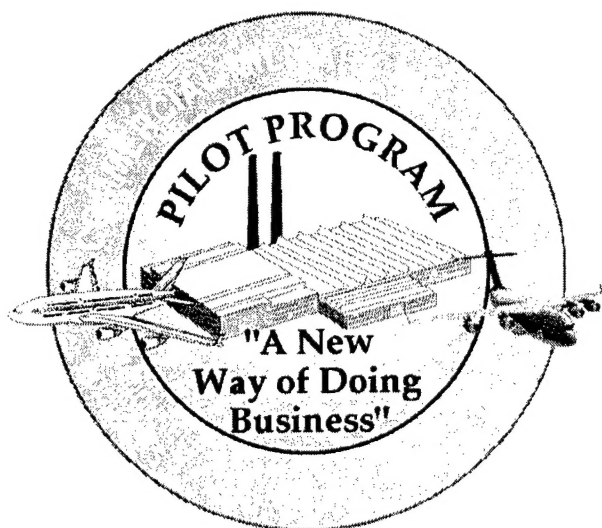
The second phase of this program (a \$26 million, 30-month effort) focuses on demonstrating best practices developed and prototyped during the earlier phase. The pilot's integrated product team

of their contract Award Fee. In addition, the C-17 Program is jointly funding Phase II of the effort with Air Force ManTech in order to ensure transition of the proposed savings to their production program. Commenting on the team's pursuit of new ways of doing business, General Kadish said, "We can change things—we don't need to wait for the government and Congress to make the changes for us."

The pilot's IPT is comprised of personnel from Air Force ManTech and the C-17 SPO; McDonnell Douglas Aerospace, the prime contractor; Vought Aircraft, a wholly-owned subsidiary of Northrop-Grumman; and Defense Plant Representative Offices. The team concluded its Phase I efforts in November 1995 after assessing business practices, manufacturing infrastructure, and product/process technology. A structured approach was used to compare commercial and military practices and processes, and document cost/benefit analyses and risk assessments. Mr Tracy Houpt, the Air Force Program Manager, said "We found that commercial practices didn't always turn out to be the best and the military practices didn't always add significant cost." Houpt also said, "The pilot team found that a significant portion of the savings identified in the program can be captured by industry adopting the best practices without statutory or regulatory relief."

The team produced a handbook during Phase I to document the program results and benefits. The handbook is available to both the government and industry by contacting Tracy Houpt, Wright Laboratory Manufacturing Technology Directorate, at (513) 255-5669 or through E-mail at [haupttj@ml.wpafb.af.mil](mailto:haupttj@ml.wpafb.af.mil). The products of Phase II will be a demonstrated set of commercial/military best practices and a more affordable, lighter-weight horizontal stabilizer for the C-17.

(IPT) will validate projected overall cost savings of over 53 percent as compared to the program's initial baseline established using the existing metal C-17 horizontal stabilizer torque box. This will be accomplished by designing, fabricating, assembling, and testing a full-scale C-17 horizontal stabilizer using practice and process improvements from Phase I. Major General Ronald Kadish, C-17 Program Director, and Colonel Richard Davis, Commander of Wright Laboratory, are both so pleased with the pilot program's results that they have awarded the contractor team "100 percent"



# High performance military product realization effort to focus on EW component manufacturing

A cooperative agreement with Northrop Grumman Electronics Systems & Integration Division (NG ESID) is underway to develop a Modular Factory for Electronic Warfare (EW) Component Manufacturing.

This development consists of an 18-month pathfinder program dedicated to the streamlining of transitioning design to manufacturing and a 24-month pilot implementation program using Microwave Power Modules (MPMs) as the demonstration hardware.

As national defense spending declines, so does the amount of funding available to support military electronics procurement. At the same time, the supplier base is decreasing rapidly, due to the low volume of hardware being procured. A custom product line for a specific military electronic system can no longer be developed, as performance is no longer the most critical factor. A common solution must be developed which looks at acquisition and life cycle costs, as well as performance.

Studies show that 80-85 percent of product recurring cost is determined within the first 20 percent of the design cycle, and material typically accounts for less than 20 percent of the cost of military electronic hardware. The major cost driver is labor, which can be greatly reduced early in product development through automation, design and process flexibility, in-control processing, and elimination of rework and scrap.

MPMs are complete microwave amplifiers of unprecedented miniaturization, and NG ESID-EWS is developing a family of MPMs to support a variety of transmitter and phased array applications.

Unsurpassed performance in terms of broadband power and efficiency has been demonstrated, but the major challenge prohibiting large scale insertion at this time is cost. MPMs have applications in various systems including electronic countermeasure, radar, and communication. They can also be used to support all broadband transmitter requirements in new system applications or in the update of existing operational systems given redesign or upgrade of current systems.

The objectives of this effort are:

- to reduce manufacturing costs by 40 percent and design costs by 20 percent;
- to reduce inventory by 30 percent and increase shop floor density by 100 percent;
- to reduce the manufacturing cycle time by 50 percent and design cycle time by 40 percent;
- to shorten the design to market cycle by 40 percent, improve work flow velocity by 200 percent, and to develop higher reliability hardware.

For more  
information,  
circle  
Reader Response  
Number 3

*Project Engineer:*

**Brench Boden**  
**WL/MTII**  
**(513) 255-5674**

*Contract Number:*  
**F33615-95-2-5564**

# Manufacturing Technology Directorate hosts Industry Days '96

Leaders from industry and the military gathered recently to attend the second annual Industry Days event held March 19-20 in the Dayton Convention Center. Heavy snow didn't dampen the spirits of those attending, as 168 people turned out to hear speakers discuss various ways of "Implementing Best Practices," in interactions between industry and the military.

Hosted by the Wright Laboratory Manufacturing Technology Directorate (MT) Industrial Base Pilots (IBP) team and TRW, Industry Days '96 reviewed advancements made towards implementing best practices to reduce cycle time, enhance affordability and improve quality.

Dr. William C. Kessler, director of MT, gave opening remarks and moderated the customer panel, comprised of Dr. Kessler; Eric Abell, C-17 Program Office technical director; Col. Robert Kayuha, ASC Acquisition Policy director; Lt. Col. Kerry Spiker, deputy chief of engineering for the F-22 Systems Program Office; Mike Walters, director of F-22 Subcontract Management for Lockheed Martin; and Mike Roush, of the TRW Automotive Electronics Group.

A common goal permeated the discussions — the need to overcome cultural problems between the military and industry when changing the way

business is conducted. Abell said that industry has a misperception of what the government wants. The misperception is that some businesses feel if it says government, it's bad, and if it says industry, it's good. He said the government wants a quality product for a fair price while getting rid of obstacles. The IBP program calls for common sense and for government and industry to look at how they do business, so the government can get what it needs at a reasonable cost. "Government has got its heart back in sound business practices," he said.

Colonel Kayuha said that the government needs to get out of the business of telling industry how to do their jobs, and instead tell industry what the government wants, not how to do it. The government needs to motivate and reward efficiency and effectiveness of contractors, subcontractors and vendors. In order to ensure acquisition reform is successful, Colonel Kayuha pointed out that government and industry must believe leadership is behind it, must apply lessons learned, and must look for new opportunities for reform.

The reform process faces another challenge in proving commercial parts can work in a military environment, Colonel Spiker noted. He said a model subcontract must be developed which entices industry to bid on military subcontracts. "Since commercial enterprise doesn't like to share detailed cost data, we need to recognize competitive procurements are one way to overcome this barrier. Overcoming this barrier is key to enticing world class suppliers and getting products faster, cheaper, and better."

Walters explained that Lockheed companies believe the key to the future is affordability, and affordability requires changes in the way they do business. These changes lead to lower cost, reduced time, and greater customer satisfaction.

In addition to the customer panel, industry and government representatives comprised panels discussing business practices, manufacturing infrastructure, and process technology.



*John Fenter presents a memento to Colonel Mushala*



# Guest speakers highlight luncheons

Those attending Industry Days '96 were treated to two distinguished guest luncheon speakers — Donald Kozlowski, senior vice president and C-17 program manager for McDonnell Douglas Aerospace, and Col. (Brig. Gen. select) Michael Mushala, F-22 system program director for the Aeronautical Systems Center.

Kozlowski spoke of some of the changes his organization has undergone, noting that they reinvented their relationship with employees and fundamentally changed the way they relate with the



*Donald Kozlowski*

union at their Long Beach facility. This cultural change resulted in processes being measured every day and tremendous inroads in quality. He said they are on a journey to employ ISO (International Organization Standardization) 9000, noting that they are "...well on our way to world class performance in that (quality) arena."

The C-17 was designed in 1980, and it's just now coming online. This demonstrates Kozlowski's opinion that indecision is very expensive. However, they've since streamlined the program, going from hundreds of military specs in 1981, to about eight today. By nearly eliminating military specs from the program they have taken about \$3 billion out of the cost structure of the program.

Reduced mandatory inspections and contractor-based control have also enabled them to improve the program and lower costs.

Colonel Mushala also feels there are tremendous opportunities available through acquisition reform. By scrubbing the mil specs, the F-22 program has seen tremendous improvement since 1991.

Lockheed Martin is the prime contractor for the F-22 vehicle and Pratt and Whitney is the prime contractor for the engine, but they have over 1,150 subcontractors in 43 states and Puerto Rico. Colonel Mushala feels there are tremendous benefits in seeking ways to better leverage the relationship between the government, the contractor and subcontractors. In his opinion, the Industrial Base Pilots (IBP) program shows there are benefits in working with subcontractors. The government is going to rely more and more on the prime contractor to certify that the subcontractors are performing as expected. By relying more on the defense industry to do the work, Colonel Mushala said they've been able to reduce the size of the F-22 SPO by more than half.

The colonel feels the military should take advantage of the best that's out there in the commercial sector by applying it to the military. "There is a genuine business case out there for combining military and commercial product lines."

He said acquisition reform is a reality, not just a buzz word, noting it's "...a mandate that we have to change the way we get the job done in an affordable manner. If it's a good idea for the Comanche, why isn't it a good idea for the F-22? That's what we need to do,"

Colonel Mushala concluded.

"Find best practices and acquisition reform initiatives that are providing a good return on investment and

apply them in our programs. This will accelerate the change process to enable us to move out faster in providing quality weapons systems cheaper, faster, and better than we have in the past."



# ManTech program manager receives Society of Women Engineers award

A ManTech program manager recently received the Society of Women Engineers (SWE) 1996 Distinguished New Engineer Award.

Mary E. Kinsella earned the award for her leadership and contributions to the Society and for the development of military electronics manufacturing technology during the past eight years. She will be presented her award in June at the SWE national convention in Portland, OR.

SWE established the Distinguished New Engineer Award in 1978 to honor women engineers who have been actively engaged in the engineering profession and who have demonstrated outstanding performance in engineering and leadership. Awardees must be active in SWE while also participating in technical and community organizations. Kinsella is one of only three people nationwide selected for this award in 1996.

Kinsella currently manages a \$21.5 million

ManTech Industrial Base Pilot (IBP) program to demonstrate the production of military electronics modules on a commercial automotive manufacturing line. The IBP program contracted to TRW Avionics Systems Division, demonstrates and implements key concepts in acquisition reform and system cost reduction using

commercial practices and integrated product teams. The program will provide 30-50 percent cost savings for electronics modules compatible with the F-22 and the Army Comanche helicopter. Prior to her current assignment, Kinsella co-managed an \$86 million joint Wright Laboratory-Advanced Research Projects Agency program in microelectronics manufacturing.

Recognized at the local and regional SWE levels for her active participation in meetings and conferences, Kinsella encourages others to join in her commitment to the recognition and advancement of women in engineering. She has been very active in the South Ohio Section since she joined SWE in 1988, serving as president from July 1992 through June 1995. Her leadership as section president resulted in a 30 percent increase in membership, a more active section, and more participation from the Wright-Patterson community.

Kinsella chairs the SWE National Women in Government Committee (WIG). In this capacity, she organized a panel of prominent government women engineers for the 1995 SWE national convention in Boston, to discuss reengineering in the federal government. She is leading another panel program for this year's Portland convention, and has increased communication and visibility of members nationwide.

A graduate of Miami University and the University of Dayton, Kinsella is a member of the Affiliate Societies Council of Dayton, a member of the Church of the Incarnation, in Centerville, and a participant in family activities at local recreation and day care centers. Her husband, Michael, is an engineer at the Wright Laboratory Aero Propulsion and Power Directorate. They have two children: Amelia, age five and Nathaniel, age two.



*Mary Kinsella*

# McDonnell Douglas selects team to receive its highest recognition

Several people from Wright Laboratory are part of a team recently selected to receive McDonnell Douglas Aerospace's highest form of recognition, its annual Model of Excellence Award.

The Military Products Using Best Commercial/Military Practices team was presented the award in a ceremony April 26, in St. Louis, Mo.

The award is designed to acknowledge individuals and teams who've made the ultimate contribution in quality to the enterprise through superior innovation. The Military Products Using Best Commercial/Military Practices team achieved excellence in quality and innovation while changing enterprise systems and processes. They demonstrated integrated product definition, provided extraordinary service to the customer, and used creativity and discipline to demonstrate processes that reduced cycle time and yielded savings to the product.

Working in conjunction with people from Defense Contract Management Command, Northrop Grumman Vought-Commercial Aircraft

Division, McDonnell Douglas Aerospace (MDA) and the C-17 Systems Program Office, the Wright Laboratory team members demonstrated that government and industry working together can define new ways of doing business which achieve significant gains in affordability. According to a statement from Jerry Ennis, vice president of the Prototype Center for MDA, this accomplishment would not have been possible without the efforts of the entire team functioning as a true partnership.

This effort is being performed by MDA under contract with the Manufacturing Technology Directorate (MT). The C-17 SPO, Northrop Grumman Vought, and the Defense Contract Management Command are also involved in the project. Dr. William C. Kessler, director of MT, was pleased with news of the award, stating that this was "...a super effort by all the teams."

The Wright Laboratory team members include: Tracy Hout, Brench Boden and Ken Ronald, all from MT; Walt Gibson and Rick Anderson, from Finance; Jane Dillon from Contracting; and Laura Terrian and Mike Ross, support contractors working in MT's Technology Transfer Center.

C-17 SPO team members include: Mike Carroll, Tim Cargle, Bob Kidd, and Kevin Vangsness.



*Part of the team at a recent meeting*

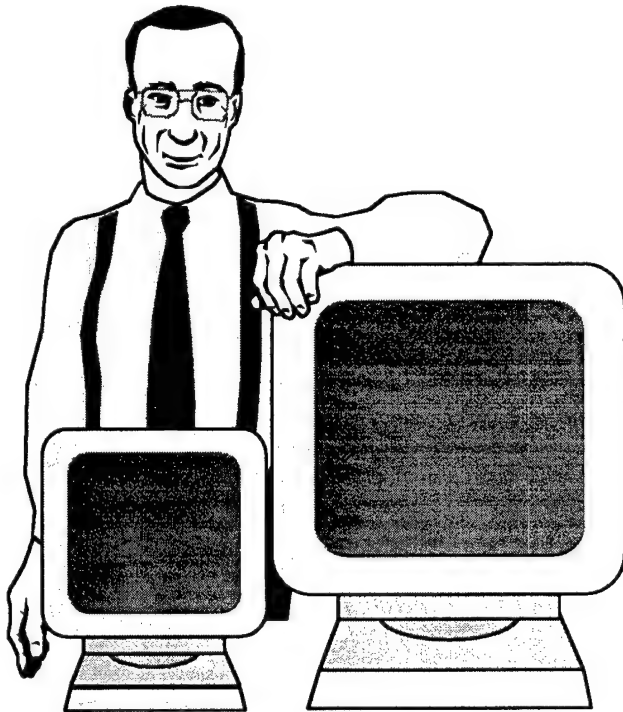
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*Transferring tomorrow's technology...today*

# ManTech homepage improvements make web use attractive & easier

The ManTech homepage continues to make great strides since coming "on line" 26 Jan 96.

Anyone with access to the internet can view the ManTech homepage at the following URL: [http://www.wl.wpafb.af.mil/mtx/mt\\_home.htm](http://www.wl.wpafb.af.mil/mtx/mt_home.htm). This leads the user to over 200 pages of ManTech



information including the Project Book, Program Status Report, brochures and invitations, success stories, and a description of ManTech activities.

According to Web Administrator, Marie Romero, the size of the homepage will continue to grow with improvements currently in the works. "We get a lot of requests for various graphics and logos which we have used on our web pages, so we're in the process of creating a database for them, which will allow people to access and download these graphics easily. We are also enhancing the employee listing in each division," she said. "Once completed, the project engineer will be directly linked to the projects he or she has worked on."

Romero has received very good feedback on

the homepage, and if imitation is a form of flattery, she can be happy in the fact that some of the designs and backgrounds created for the ManTech homepage are being used by other organizations on the web. "Several of our success stories are currently linked from the Manufacturing Technology Science & Technology homepage, MIT, and other web pages," she said.

A text-only version of the Project Book will be available soon for the users that haven't been able to read the frames on the homepage. Romero said that sometimes this is due to insufficient memory on the video card, or the monitor resolution is set too low. She recommends setting monitors to 32k colors or greater, for users with a one megabyte or better video card.

Romero concluded that after a rather hurried beginning and a rush to get on line, they are now adding things people would like to see. Feedback can be provided to her via the internet, or by calling (513) 255-2456, ext. 219.

Here are some other related homepage addresses:

Wright Laboratory:

<http://www.wl.wpafb.af.mil/>

Defense Technical Information Center:

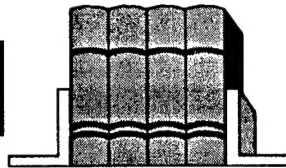
<http://www.dtic.mil/>

Director of Defense Research & Engineering:

<http://www.acq.osd.mil/ddre/>



## Reports



### **Planning of Manufacturing Science and Technology Activities With Industry**

Alog Number: 3804  
Contract Number: F33615-92-D-5812  
Technical Report Number: WL-MT-075  
Distribution: LIMITED

### **Independent Assessment Team Identifying Technical and/or Programmatic Areas of Risk Associated with the TMCTECC Program**

Alog Number: 3805  
Contract Number: F33615-92-D-5812  
Technical Report Number: WL-MT-013  
Distribution: LIMITED

### **Design and Manufacture of Low Cost Composites (DMLCC), Wing**

Alog Number: 3799  
Contract Number: F33615-91-C-5720  
Technical Report Number: INTERIM  
Distribution: LIMITED

### **Manufacturing Technology for Premium Quality Titanium Alloy for Gas Turbine Engine Rotating Components - Phase II**

Alog Number: 3792  
Contract Number: F33615-88-C-5418  
Technical Report Number: WL-TR-95-8025  
Distribution: LIMITED

### **Military Products Using Best Commercial/Military Practices Phase I**

Alog Numbers: 3819, 3820, 3826, 3827  
Contract Number: F33615-93-C-4334  
Technical Report Number: INTERIM  
Distribution: LIMITED



## Videos

### **Pattern Theory Demonstration**

Alog Number: 48  
Length: 8:15  
Distribution: LIMITED

### **Tomorrow's Air Force: Reshaping the Future**

Alog Number: 49  
Length: 1:12:55  
Distribution: LIMITED

### **The Factory Integrated Composite Center**

Alog Number: 65  
Length: 18:30  
Distribution: LIMITED

## Ordering

Wright-Patterson personnel or their contractors may contact the Wright Laboratory (WL) Technical Library, (513) 255-7415. They must be registered with the library in order to obtain reports. Classified or limited documents will be released only to the contract monitor. Reference the Alog number listed.

Non-Wright-Patterson personnel who wish to obtain any WL documents, and are registered with the Defense Technical Information Center, should contact the center. To register call 1-800-CAL-DTIC.

To obtain unlimited/unclassified documents, contact the National Technical Information Service, (703) 487-4650.

For further information call the Technology Transfer Center at (513) 256-0194.

# 14 *END OF CONTRACT FORECAST*

DATE	PROJECT TITLE CONTRACT NO.	PRIME CONTRACTOR	POINT OF CONTACT
July 1996	Metrics for Agile Virtual Enterprises F33615-95-C-5513	Sirius-Beta Virginia Beach, VA	Capt. Paul Bentley (513) 255-7371
July 1996	Strategic Planning & Operating Tools for Agile Enterprises F33615-95-C-5514	Lehigh University Competitive Technologies Inc. Bethlehem, PA	George Orzel (513) 255-7371
August 1996	Labor Infrastructure for Agile High Performance (AHP) Transformations F33615-95-C-5512	Work & Technology Institute Washington, D.C.	Capt. Paul Bentley (513) 255-7371
August 1996	Electronics Sector End-to-End Pathfinder (Exchange of Engineering Information Through the Value Chain) F33615-94-C-4431	Arizona State University, CIM Systems Research Center, Tempe, AZ	Wallace Patterson (513) 255-8589
August 1996	Agile Manufacturing Information Infrastructure F33615-94-C-4400	Microsoft & Computer Technology Austin, TX	Brian Stucke (513) 255-7371
September 1996	Advanced Collaborative Open Resource Network (ACORN) F33615-94-C-4450	Carnegie Mellon University Pittsburgh, PA	Brian Stucke (513) 255-7371
September 1996	Discontinuous Reinforced Aluminum (DRA) F33733-89-C-1011	Composite Specialties Incorporated Chatsworth, CA	Eric Pohlenz (513) 255-3701
September 1996	Development of a Low Cost Environmentally Benign All-Sputtered Fabrication of Thin Film Transistors (TFTs) for Active Matrix Liquid Crystal Displays (AMLCD) F33615-94-C-4446	Intevac Incorporated Santa Clara, CA	Robert Cross (513) 255-2461
September 1996	Below-A-Minute Burn-In (BAMBI) for Known Good Die F33615-94-C-4432	Innovative Systems & Technologies Tampa, FL	Bill Russell (513) 255-7371
September 1996	Development of a New Precision Magnetic Spindle Technology SPO900-94-C-0007	Precision Magnetic Bearing Systems Schnectady, NY	Deborah Kennedy (513) 255-3612
September 1996	Low Cost Electrode Fabrication Process for High Definition System (HDS) Color Flat Panel Displays (FPDs) F33615-94-C-4411	Photonics Imaging Northwood, OH	Micheal Miller (513) 255-2461
September 1996	Improved Emissive Coatings for Super High Efficiency Color AC-PDPs F33615-94-C-4408	Photonics Imaging Northwood, OH	Robert Cross (513) 255-2461
September 1996	Precision Thick Film Technology for 100% Yield of Large Area High Resolution Color AC-PDPs F33615-94-C-4406	Photonics Imaging Northwood, OH	Micheal Miller (513) 255-2461

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Summer 1996



The USAF Manufacturing Technology

# PROGRAM STATUS REPORT

Summer 1996

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